

T02D03 – 2.3 IB Practice MS

2.3 Electron arrangement - 2 hours

2.3.1 Describe the electromagnetic spectrum. (2)

2.3.2 Distinguish between a continuous spectrum and a line spectrum. (2)

2.3.3 Explain how the lines in the emission spectrum of hydrogen are related to electron energy levels. (3)

2.3.4 Deduce the electron arrangement for atoms and ions up to $Z = 20$. (3)

1. A(3)

2. C(4)

3. C(5)

4. A&D(4) – either is fine, but both are correct

5. B(5)

6. D(6)

7. B(5)

8. (a) (4x1) $IV < I < II < III$

ultra violet radiation < yellow light < red light < infrared radiation;

1

(b) (5x1) A continuous spectrum has all colors/wavelengths/frequencies whereas a line spectrum has only (lines of) sharp/discrete/specific colors/wavelengths/frequencies;

1

(c) (4x1) UV-B radiation has shorter wavelength (or higher frequency);

(5x1) hence, has higher energy;

(6x1) increases risk of damage to skin cells/OWTTE/causes cancer;

3

[5]

9. (4x2) Al : 2,8,3;

N : 2,5;

F : 2,7;

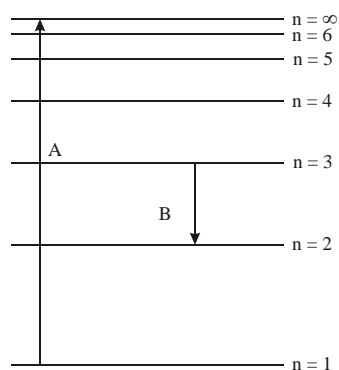
2

Award [2] for three correct, [1] for two or one correct.

Accept correct configuration using s,p,d notation.

[2]

10.

(i) (5x1)(6x1) line starting at $n = 1$;
line finishing at $n = \infty$ (not above ∞);
upward arrow;

2 max

3 correct [2], 2 correct [1].

(ii) (5x1) Line from $n = 3$ to $n = 2$;

(5x1) Arrow pointing downward (in any transition);

2

[4]

| Legend | | Free Response Section (Paper 02) | | | | | | | | | | | |
|----------|--------|------------------------------------|----------|------|-----|------|-----|------|--------|-----|-----|-----|---|
| Level: | Needed | Grade | Possible | 3 | 4 | 5 | 6 | 7 | Cutoff | 3 | 4 | 5 | 6 |
| Above +6 | 0% | 2 | 0 | 50% | 0 | 40% | 1.6 | 30% | 1.5 | 20% | 0.4 | 10% | 0 |
| Above +5 | 10% | 3 | 0 | 80% | 0 | 50% | 2 | 40% | 2 | 30% | 0.6 | 20% | 0 |
| Above +4 | 20% | 4 | 4 | 95% | 0 | 80% | 3.2 | 50% | 2.5 | 40% | 0.8 | 30% | 0 |
| Above +3 | 30% | 5 | 5 | 100% | 0 | 95% | 3.8 | 80% | 4 | 50% | 1 | 40% | 0 |
| Above +2 | 40% | 6 | 2 | 100% | 0 | 100% | 4 | 95% | 4.75 | 80% | 1.6 | 50% | 0 |
| Above +1 | 50% | 7 | 0 | 100% | 0 | 100% | 4 | 100% | 5 | 95% | 1.9 | 80% | 0 |
| Level | 80% | Multiple Choice Section (Paper 01) | | | | | | | | | | | |
| Below -1 | 95% | Grade | Possible | 3 | 4 | 5 | 6 | 7 | Cutoff | 3 | 4 | 5 | 6 |
| Below -2 | 100% | 2 | 0 | 50% | 0.8 | 40% | 0.8 | 30% | 0.9 | 20% | 0.2 | 10% | 0 |
| Below -3 | 100% | 3 | 1 | 80% | 0.8 | 50% | 1 | 40% | 1.2 | 30% | 0.3 | 20% | 0 |
| Below -4 | 100% | 4 | 2 | 95% | 1 | 80% | 1.6 | 50% | 1.5 | 40% | 0.4 | 30% | 0 |
| Below -5 | 100% | 5 | 3 | 100% | 1 | 95% | 1.9 | 80% | 2.4 | 50% | 0.5 | 40% | 0 |
| Below -6 | 100% | 6 | 1 | 100% | 1 | 100% | 2 | 95% | 2.85 | 80% | 0.8 | 50% | 0 |
| Below -7 | 100% | 7 | 0 | 100% | 1 | 100% | 2 | 100% | 3 | 95% | 1 | 80% | 0 |